

CLAIMS

1. An engine exhaust sensor diagnostic system, comprising:
an inlet oxygen sensor; and
a controller that monitors a signal generated by said oxygen
sensor, determines a rate of change of said signal, computes at least
5 one diagnostic parameter based on said rate of change, and indicates
a malfunction of said oxygen sensor if said diagnostic parameter is
smaller in magnitude than a corresponding threshold.
2. The system of claim 1 wherein said controller indicates
proper function of said oxygen sensor if said diagnostic parameter is
larger in magnitude than said threshold.
3. The system of claim 1 wherein said controller classifies
said rate of change into one of a positive class, a negative class and an
excluded class.
4. The system of claim 3 wherein said excluded class rate of
change is ignored.
5. The system of claim 3 wherein said threshold includes
negative class thresholds and positive class thresholds and wherein a
positive class diagnostic parameter is compared to said positive class
thresholds and a negative class diagnostic parameter is compared to
5 said negative class thresholds.
6. The system of claim 5 wherein said controller indicates a
positive class malfunction if said positive class diagnostic parameters
are below said positive class thresholds and indicates a negative class

malfunction if said negative class diagnostic parameters are above said
5 negative class thresholds.

7. The system of claim 5 wherein said controller indicates
proper positive class function if said positive class diagnostic
parameters are above said positive class thresholds and indicates
proper negative class function if said negative class diagnostic
5 parameters are below said negative class thresholds.

8. A method of monitoring operability of an oxygen sensor,
comprising:
monitoring a signal generated by said oxygen sensor;
determining a rate of change of said signal;
5 computing diagnostic parameters based on said rate of change;
and
indicating malfunction of said oxygen sensor if said diagnostic
parameters are smaller in magnitude than corresponding thresholds.

9. The method of claim 8 further comprising indicating
proper function of said oxygen sensor if said diagnostic parameters are
larger in magnitude than said thresholds.

10. The method of claim 8 further comprising classifying said
rate of change into one of a positive class, a negative class and an
excluded class.

11. The method of claim 10 wherein said rate of change
classified in said excluded class is ignored.

12. The method of claim 10 wherein said thresholds include negative class thresholds and positive class thresholds and wherein negative class diagnostic parameters are compared to said negative class thresholds and positive class diagnostic parameters are
5 compared to said positive class thresholds.

13. The method of claim 12 further comprising:
indicating a positive class malfunction if said positive class diagnostic parameters are below said positive class thresholds; and
indicating a negative class malfunction if said negative class
5 diagnostic parameters are above said negative class thresholds.

14. The method of claim 12 further comprising:
indicating proper positive class function if said positive class diagnostic parameters are above said positive class thresholds; and
indicating proper negative class function if said negative class
5 diagnostic parameters are below said negative class thresholds.

15. A method of diagnosing operability of a sensor,
comprising:
monitoring a signal generated by said sensor;
determining a rate of change of said signal;
5 classifying said rate of change in one of a positive class, a negative class and an excluded class;
computing diagnostic parameters for each of said classes based on said rate of change;
indicating malfunction of said sensor if said positive class
10 diagnostic parameters are below positive class thresholds; and
indicating malfunction of said sensor if said negative class diagnostic parameters are above negative class thresholds.

16. The method of claim 15 wherein said excluded class rate of change is ignored.
17. The method of claim 15 further comprising:
indicating proper positive class function if said positive class diagnostic parameters are above said positive class thresholds; and
indicating proper negative class function if said negative class diagnostic parameters are below said negative class thresholds.
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